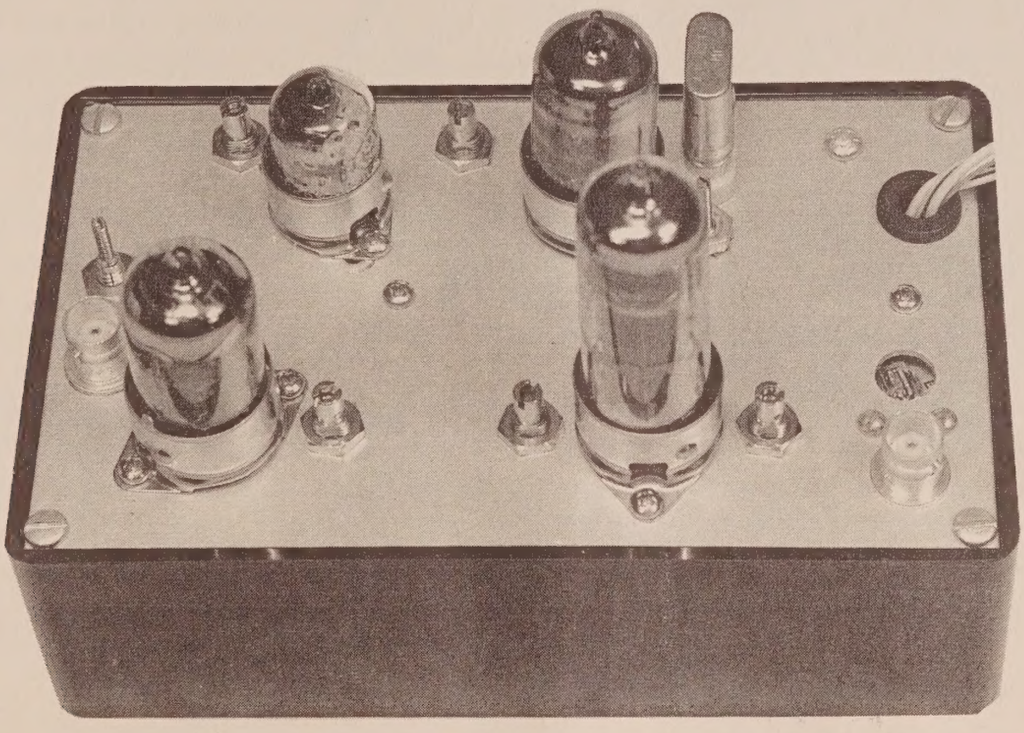
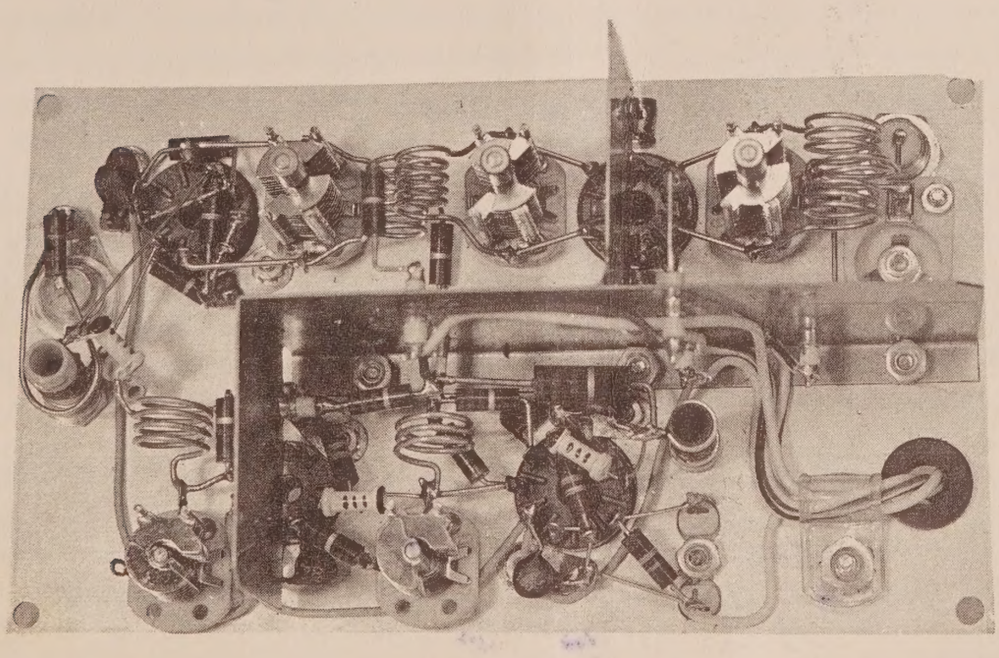
VHFER

LEARN BY DOING

50 MC. AND UP

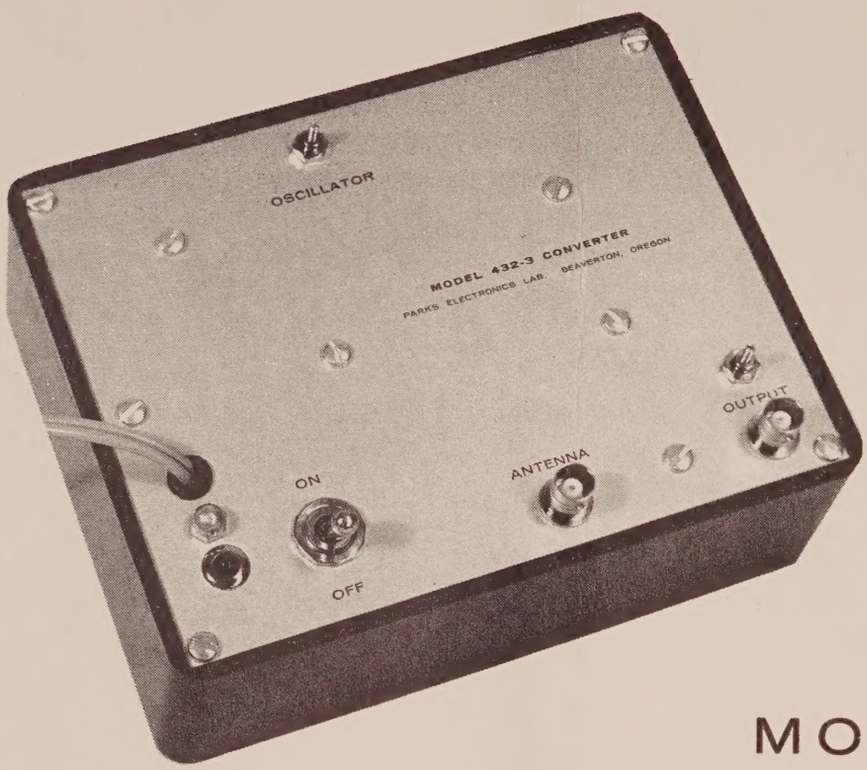
Volume 5, No. 5 Sept.-Oct., 1967





A SIDEBAND TRANSMITTING CONVERTER

A 432 DX MAN'S CONVERTER



MODEL 432-3

NEW FEATURES:

--All solid-state design
--Zener-regulated a.c. power supply
--Extremely low-noise front end-- 4 d.b. or less.
--High image and I.F. leak-through rejection
--Excellent frequency stability.

This converter uses the Texas Instruments TIXM10 transistor. It is the replacement for the former TIXMO5. We believe them to be superior to the transistors we formerly used. Their replacement cost is low, an important factor if you're careless with r.f. This converter has a single tuned r.f. stage, something our previous converters and preamps did not have. It cuts down on interference from other stations adjacent to the 432 band. We do not make a preamplifier for 432 at present.

I.F. ranges available put 432 MHz at 26, 27, 28.1, 28.5, 29, 30.5, 50 and 51 MHz. We do not make lower I.F. ranges because of image problems. The 28.1 and 28.5 ranges are for ham band only receivers. 432 activity can be both sides of 432 so you should choose an I.F. that lets you tune down to about 431.5 anyway.

Only type BNC connectors are furnished because SO-239 and phono types are not as good at this frequency.

Converters are available from stock.

ORDERING INFORMATION: Price is $55.00 postpaid. Add 35¢ for Special Handling, a fee charged by the post office for faster delivery. Add $2.50 for Air Mail.

ODDS & ENDS
by K7AAD

We are continuing with the W6GD notes and will probably continue to do so for a couple of issues. W6ORS of Arcadia has offered to send us corrections and additions to the previously published notes which he obtained thru correspondence with Mr. Wright. For the record, there was a copyright on the notes and we have obtained permission to publish them from Mrs Wright. We are presenting them exactly as previously published although it is a little inconvenient when presented as a series.

W6DNG is using a W6GD extended-expanded on 2 for moonbounce with the addition of directors. He has 48 elements, 16 each of driven elements, reflectors and directors. Bill's gain measurement of his array is just under 20 db over a dipole. He says it is very reliable, not being affected by wet weather like his Yagi arrays. He says that it works better than any of his previous 50 odd arrays. Its only shortcoming compared to the Yagi arrays is in the front-to-back ratio. Bill now has 24 2-way complete QSOs with OH1NL and 6 with F8DO via the moon.

K6MYC has been having partial success lately in skeds with VK3ATN. Mike is working on a phase-lock post-detection scheme. The satellite from Munich is to be launched shortly from White Sands via balloon. It will be up about 12 hours and be recovered. Should provide QSOs for a few western states. Time of launch is not known at this time. Listen on VHF net.

It is generally agreed that the Union Carbide 2N4416 can do about 2.5 db noise figure at 2 meters. The UC734, a cheapie version, does almost or equally as well on 2. Motorola has a plastic version of the 4416. This type of transistor is probably the best of the reasonably priced ones at 432 or 144. Follow Union Carbide's circuit for 432 & you'll hopefully find it works. Use your own ideas and you're in trouble. If you run up the current, better cool them with a heat sink to get best n.f. For r.f. protection, use back-to-back 1N100s at the coax input. No deterioration of performance, and saves transistors. Info from K6MYC, K6KV and K7ZIR. The west coast was copied on 6 in Hawaii recently. MUF is going up. Be ready.

VHFER is getting to be a terrible chore for me. When we started I had an avid amateur, W7UHF, working with me and I was active too. I also had a ham printer to come in and help and we got articles. Now I am inactive due to very heavy medical business, I have no hams in my company, and my printer helper was injured so I do everything but the typing of submitted text and sometimes I do that. In 2 days I'll have my 3rd month-long trip to the east coast and western Europe in the last 13 months. VHFER is rather heavily subsidized, which I don't mind when business is good. But the big loss is in the time I have to give it because we have no backlog of articles. Many times, like this time, we print about the day after we get an article needed to complete the issue. Something is going to have to change. We have to either get more acceptable articles or we change to quarterly publication or we quit entirely. Support in the way of subscriptions is all I could hope for. But if we can't in some way serve VHF hams of an advanced type there is no point in continuing. I believe the level of articles in the major publications with regard to VHF has improved considerably since we started printing VHFER, so the need for us may no longer exist. It's pretty much up to you which way we go if you're an advanced ham. K7AAD

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28. In VHF work, height above ground is very important, as it is on the lower frequencies; but in this case the more height the better, except in some extremely rare and unusual conditions. In general, for communication over the horizon, doubling the antenna height at one station will increase the signal both ways by about 6 db. This is equivalent to 4 times the power. Doubling this new height gives another 6 db, but you soon reach a practical limit. For example: an antenna 100 feet high would deliver a signal roughly equivalent to 16 times the power of that delivered by a similar antenna 25 feet high. Locally the difference would be less. Any time you pull the antenna up and out of trees and other surrounding objects the improvement would be better than that quoted here. An antenna "leaning against the garage" is not utilizing its full capabilities.

29. This "low angle of radiation" business needs a little clarification. We want a low angle of radiation at VHF; right on the horizon so to speak. Most vertical antennas give a low angle inherently (the ground plane is one exception). A center fed, half wave dipole has the center of its very broad lobe at 90 degrees from its axis, hence right on said horizon. So has an arrangement of several dipoles, conventional or extended, stacked one above the other and fed in phase. It is not correct to say that the stacked array has a lower angle of radiation than does the simple dipole. Both have a low angle of radiation, but one has more power concentrated at this angle than has the other.

30. Quite a few experimenters try to determine the polar pattern of a 2 meter array by rotating it while listening to a distant signal. This can lead to considerable error, because of the presence at this frequency of first class reflections from miscellaneous objects. These cause the signal to approach the array from various directions. They confuse the apparent pattern to a considerable extent, and are outside our control. The <u>true</u> pattern of any array can only be determined locally by means of testing apparatus that is relatively insensitive to reflected signals. The most accurate way is to place the array in the center of a large field and energize it. Then place a field strength meter several hundred feet away and make readings while rotating the array. The receiving and transmitting polar patterns should be identical if couplings are such that the transmission lines can neither transmit nor receive appreciable amounts of energy.

It must be understood that the extended spacing vertically polarized arrays have some extra side lobes, but they are not serious. Yagis have nicer patterns than the extended arrays but the latter should give you more gain per element. The presence of a side lobe does not necessarily mean that it has subtracted a substantial amount of power from the main lobe. The entire power in all the side lobes of some of these arrays, if added directly to the main lobe (a neat trick if you could do it) might only add a fraction of one db to the total gain. Antenna gains normally are defined with respect to the gain of a half wave dipole of the same polarization, at the same effective height, and with the <u>same power input to each antenna</u>.

31. Soldered connections to the driven elements are very desirable. Aluminum soldering is very practicable if done properly. It is preferable to use a type of aluminum solder that has to be soldered with a flame, which has a reducing action. Soldering iron techniques are likely to produce defective joints sooner or later. If you are worried about corrosion of the aluminum elements by salt air, there are various types of sprays and protective coatings that may be employed. Aluminum clothes line (.147" diameter) is quite satisfactory electrically for an inexpensive element material, but has little rigidity and may bend in severe winds. Dimensions given for 1/4" tubing should be close enough for the wire.

32. A very interesting insulator is polystyrene foam, which is sold in the 5 and 10 stores at Christmas for Christmas ornaments. It can also be obtained from plastic supply houses. It is pure white, looks like a section cut out of a snow bank, and has excellent VHF and UHF insulating properties. The weight is about one pound per cubic foot and the dielectric constant is so close to that of air that it might as well be. While not too strong, it is so light that large blocks may be used where needed. It can be cut with a knife, hacksaw or razor blade. Blocks of the material can be used to space transmission lines away from poles, walls and other objects. Experimental arrays may be made by pushing elements through sheets of the material at the proper locations. The material is used in life jackets and toilet tank floats, which shows that it is waterproof.

33. A considerable amount of the effectiveness of a good array is lost unless there is a suitable method of rotation. By suitable is meant speed and pin-point accuracy. Hand rotation is not getting the attention it deserves. Where it can be used it far surpasses the usual motor rotation. You can, by using a drum and taut tillering device, or a hand wheel mounted directly on the bottom of the shaft, spin a 16 element beam around in a matter of seconds without damaging it. Furthermore you can spot it within one degree of arc and "tune" it into the deep, sharp null either side of the main lobe, which null often provides tremendous attenuation for interfering signals. The 4 and 8 element arrays function similarly in this respect, and the 16 element array does even a better job. Sometimes, when tuning out interference in this manner you will notice that the null on one side is much more effective than the opposite one. This is due to some unwanted reflections coming in from a random direction and does not indicate that the antenna pattern is unbalanced. See Section 30.

Very few motor driven rotators will spot you within 10 degrees, or provide even that accuracy of indication. With the 16 element arrays you can "see" deviations of one or two degrees off the nose with a sensitive indicating meter in the receiver. By the time you are 10 degrees off it is very noticeable.

It is also possible, and very desirable, to establish precise bearings by sighting along the long dimension of the array while lining it up with the North Star. Don't forget that the star deviates a little from true north. A solar Ephemeris, a surveyor, or an astronomer are very helpful at this point.

If balanced open wire line is used all the way to the receiver a Faraday shield will be very useful between antenna coil and grid coil. This will eliminate signals picked directly on the line, thus providing full utilization of the directive properties of the antenna, and often improves the signal to noise ratio.

34. It is of interest to note that on 10 and 20 meters the same general types of rectangular arrays are very effective, if you are fortunate enough to have the real estate to hold them. Horizontal polarization should be used because of more desirable transmission characteristics; and no more than two or three stacks (one above the other) should be used, because of undesirable narrowing of the vertical lobe, which will increase fading. If the array is located directly over salt water, or salt water marshes vertical polarization may have the edge. On 10 the array should be about 45-55 feet above ground; on 20, about 50-65 feet. This is complicated by lack of knowledge of true ground level, but the figures shown are good average values. Tilting 10 and 20 meter arrays to attempt to change the angle of transmission is useless. All that occurs is a distortion of the pattern.

Increasing the broadside width of the array, with more elements, or with extended elements, will give a greater increase in effectiveness than any other change. Extended vertical separation between stacks (with a limit of three stacks) is the next best change. Adding directors gives the least improvement of the three possibilities.

35. Many queries are received concerning a source of suitable aluminum tubing. The Pacific Metals Co. carries a complete line. The recommended material is 1/4" O.D., 0.035" wall thickness, 61 ST6 Dural in 12 foot lengths. Weight per length is .336 lbs. They will deliver fairly small orders free in their metropolitan areas, but only to commercial establishments such as hardware stores, factories, radio and TV stores, etc. They would appreciate group buying, to avoid too many very small orders. They can also furnish aluminum solder.

36. The 2 meter antennas shown in the table below are vertically polarized and of the types described in these notes. Horizontally polarized antennas of like configurations will have similar gains.

All arrays referred to have one parasitic element per driven element, i.e., an 8 element array has 4 radiators (driven in phase) and 4 parasitic reflectors, etc. Conventional spacing means one-half wave separation between adjacent current maximum points on radiators in both the vertical and the horizontal directions. Extended spacing means 3/4 wavelength separation in a co-linear direction (vertically in this case) and 0.65 or 0.75 wavelengths broadside separation, depending upon whether there are two broadside rows in the first case (the 4 or 8 element arrays) and three or more broadside rows in the second case (16 element arrays). Reflector spacings are 1/4" wavelength.

ANTENNA GAINS

Type of Antenna	Aperture in sq. ft. (2 meters)	Gain over half wave dipole, db.
2 co-linear half waves conventional		1.9
2 co-linear elements, extended		3.2
4 " " "		6.0
4 Element array, conventional	11	6.4
4 " " , extended broadside	14.4	7.6
8 " " , conventional	22	9.0
8 " " , extended both ways*	35	11.0
16 " " , conventional	66	12.0
16 " " , extended vertically	80	13.6
16 " " , extended both ways †	120	15.2
24 " " , conventional	107	14.0
24 " " , extended vertically	133	15.4
24 " " , extended both ways	200	16.9

* If this antenna is modified to have one wavelength broadside spacing, the gain will be 9 db.

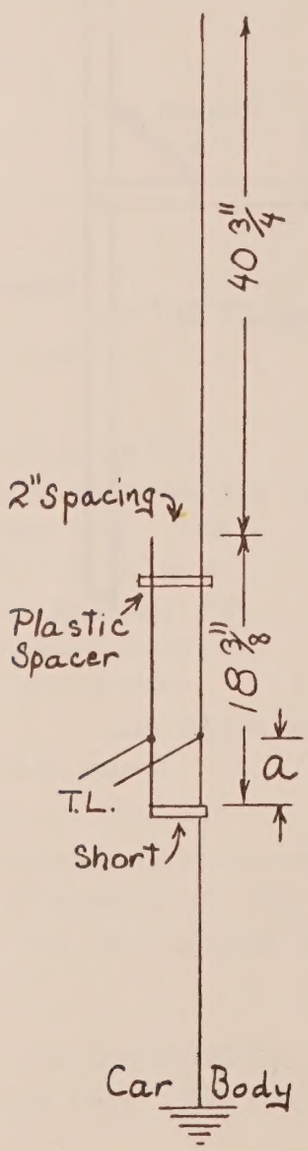
† If this antenna is modified to have one wavelength broadside spacing, the gain will be 12.8 db. These show the penalty of deviating too far from the optimum spacing.

The basic purpose of this table is to show that an approximate relationship exists between the aperture of a rectangular array and its gain, and is not solely or primarily a function of the number of elements.

If this reasoning is carried further it can be shown that the aperture required for a 20 db 2 meter rectangular array is around 400 square feet. The nearest practicable application would most likely have to be somewhat larger, to provide the proper grouping and spacing of elements. Groups of end-fire arrays will have comparable or even larger volumes, for similar gains.

37. A good thing to remember in antenna work (as in other fields) is that meticulous attention to a lot of small and apparently unimportant details means the difference between a mediocre and an outstanding job. A certain sense of proportion is also desirable, to avoid misplaced effort. No amount of testing or adjustment will make a good antenna out of one with inherently poor characteristics. Why knock yourself out trying to get the last half db out of some antenna, when by using some improved design you may get an increase of several db?

Fig 1 "J" ANTENNA FOR MOBILE USE 144 - 148 mc



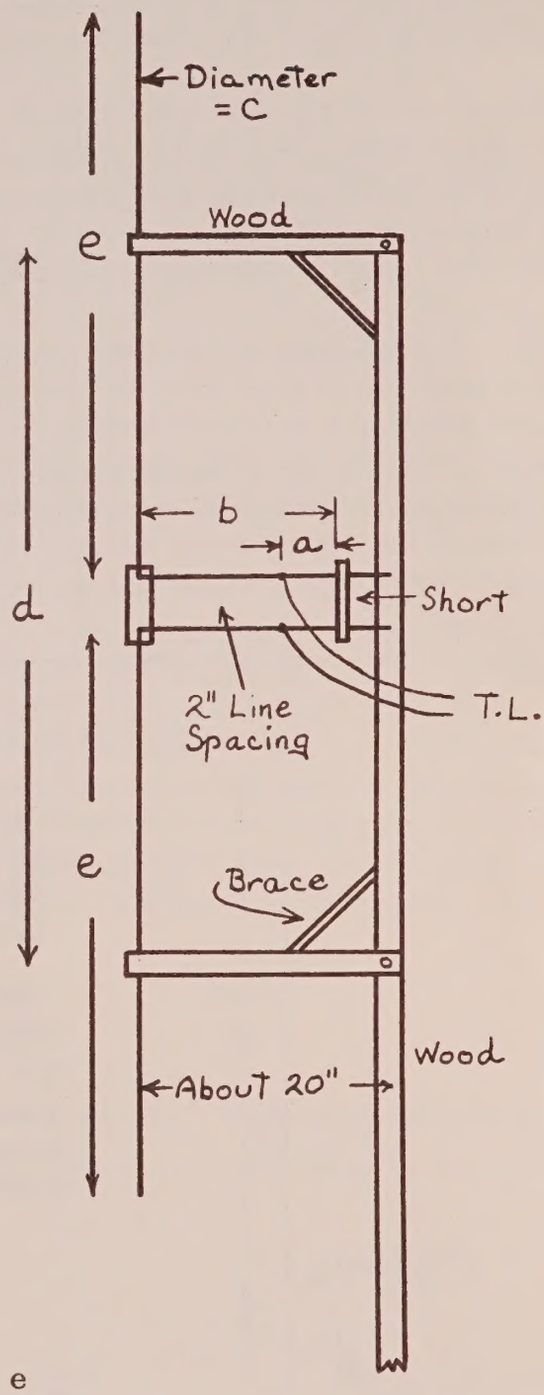
Use any suitable whip over 60" long. Place as high as feasible. J section may be of 1/4" O.D. Tubing with solid short at bottom. Whip may be grounded to car.

Place plastic spacer about 3" below top of J section. This reduces leakage across insulator, when wet, and minimizes impedance changes. Don't use 5/8 wave radiator. The extended length is not effective in this application; and the extra length completely upsets the standing wave balance on J section.

Line Impedance	Tap Point "a"
300 ohms	2 1/2"
470 ohms	4 1/4"

In a car the most practical feed method is to use coax up to a point just below the short on the J section; then go into a 4 to 1 balun. If 72 ohm cable is used, connect to the 300 ohm point on the J section through about 6" of twin lead.

Fig. 2 EXTENDED FULL WAVE ANTENNA



No insulation required except between radiators, for rigidity. Clamp directly to wood or push through drilled holes. Supporting pole should preferably be non-metallic for a foot or two below bottom of lower radiator. The two-inch phasing line is made of the same material as the radiators.

Transmission line should go out to right 40 or 50 inches from radiators (if possible) before proceeding downward. There may be some dips in the polar pattern somewhere in the direction of this line, but otherwise the pattern is approximately omni-directional (circular).

Measurements shown below were taken over a long period of time, with different arrangements and different measuring equipment. Values of "a" shown for different element diameters over 5/16" may have slight discrepancies. These are relatively unimportant.

Note: The 4 columns under "a" are different line impedances to transmitter.

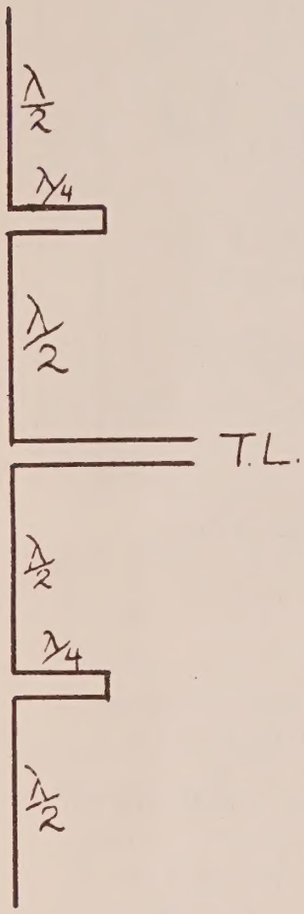
For method of terminating this antenna yourself, follow instructions in text.

All dimensions shown below are in inches.

a				b	c	d	e
150 Ω	200 Ω	300 Ω	470 Ω				
	3 1/4	3 7/8	4 3/4	14 1/4	.147	58 1/2	48
2 1/4	2 5/8	3 7/8	4 1/2	13 3/4	1/4	58 1/2	48
2 3/4	3 1/2	4 5/8	5 5/8	14 3/4	5/16	57 1/2	47
		4		14 1/2	3/8	57	46
		4 5/8		15 7/8	1/2	56 1/2	45

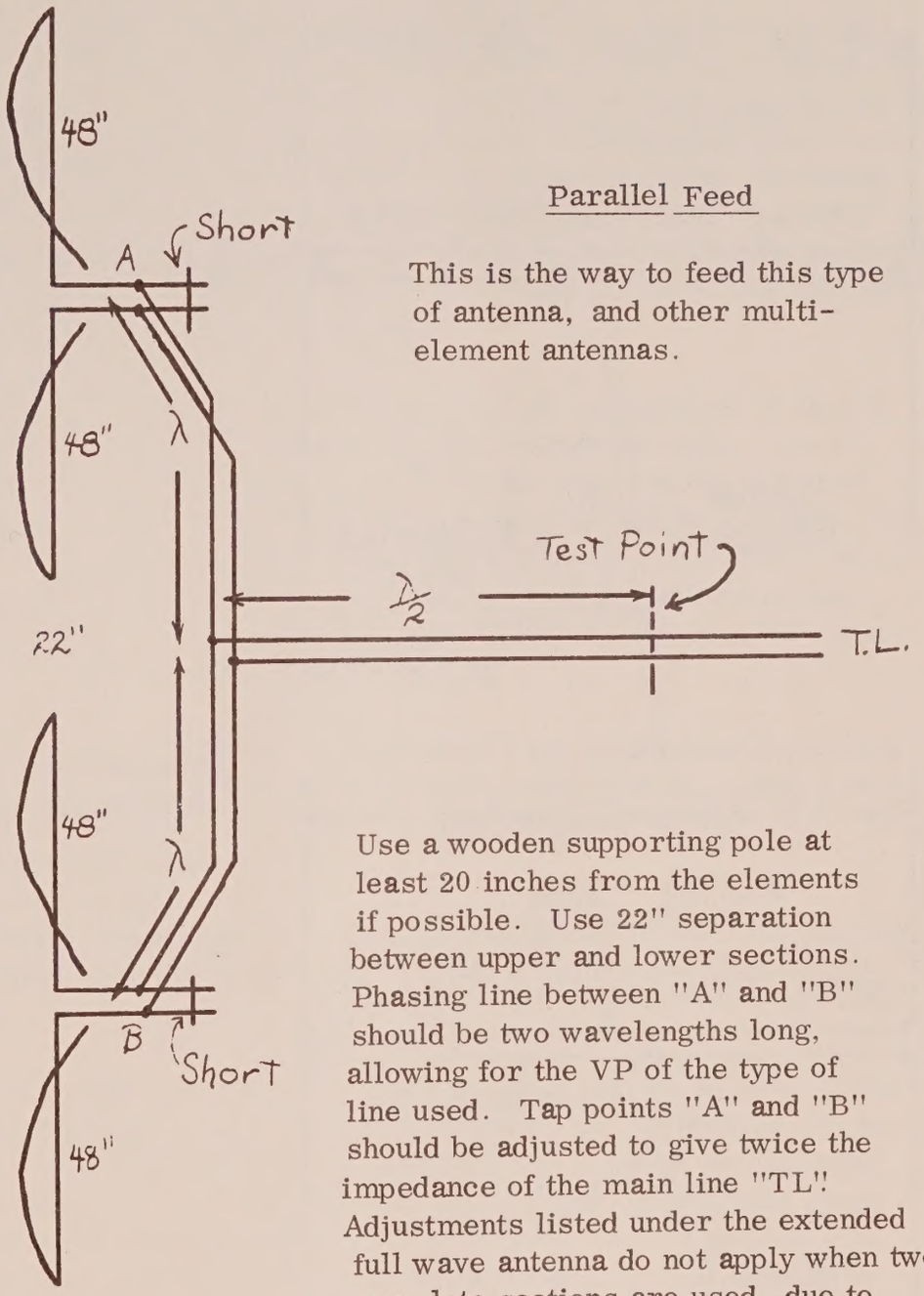
144 - 148 mc
Gain 3.2 db

Fig. 3 STACKED EXTENDED FULL WAVES 144 - 148 mc — Gain 6 db



Series Feed

Don't feed an antenna this way, even if the elements are only a half wave long. The elements will seldom be in phase, or stay in phase, due to complex coupling between the elements and quarter wave stubs.



Parallel Feed

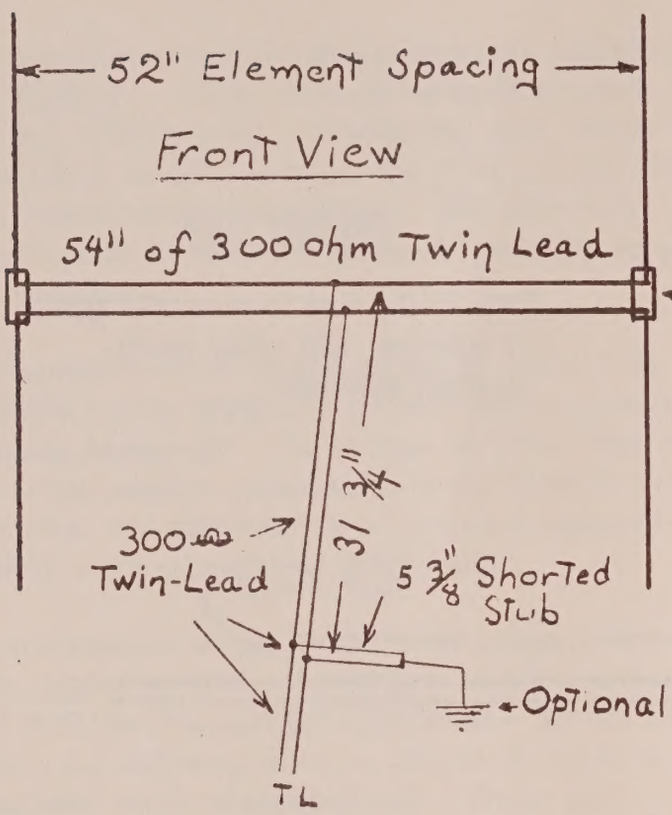
This is the way to feed this type of antenna, and other multi-element antennas.

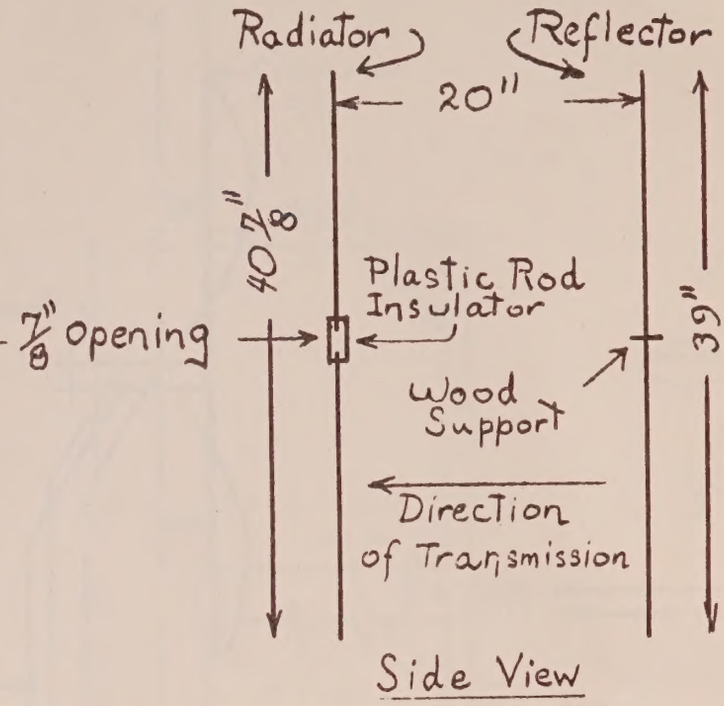
Use a wooden supporting pole at least 20 inches from the elements if possible. Use 22" separation between upper and lower sections. Phasing line between "A" and "B" should be two wavelengths long, allowing for the VP of the type of line used. Tap points "A" and "B" should be adjusted to give twice the impedance of the main line "TL". Adjustments listed under the extended full wave antenna do not apply when two complete sections are used, due to interaction between them. Mark a test point on the main line (See Sec. 9) and adjust short and tap points in unison to obtain match on "TL."

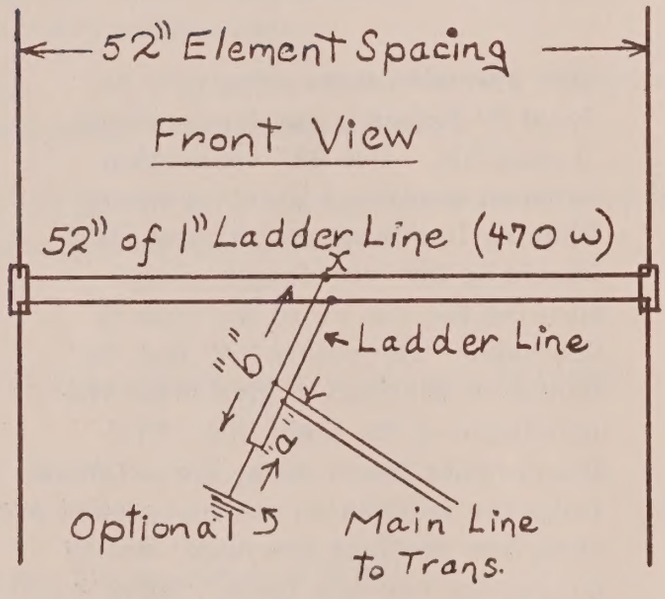
An alternate method is to connect line TL to the center of each full wave section through a similarly arranged Y section, and use a single matching stub at the junction. In all cases though the phasing must be as shown above. "Top to Top and Bottom to Bottom".

This antenna is non-directional except for a certain amount of distortion due to the presence of the lines. The first null is 19 degrees above the horizon.

Fig. 4 FOUR ELEMENT ARRAY — EXTENDED BROADSIDE SPACING
144 - 148 mc 7.6 db Gain







Two different front views show optional types of phasing and matching harness.

Twin-lead harness is extra long to permit pulling in near pole, for support. Polar pattern: First null 51 degrees off center of beam. Next lobe off end, but fairly weak. Minor lobes in rear quadrants.

	Main Line Impedance	"a"	"b"
	200 ohms	3 3/8"	9 1/8"
146 mc	300 ohms	4 1/8"	9 1/8"
	470 ohms	5 1/4"	9 1/8"
	200 ohms	3 1/2"	9 3/4"
145 mc	300 ohms	4 3/4"	9 3/4"
	470 ohms	6 1/2"	9 3/4"

Each radiator consists of two 20" lengths of 1/4 O.D. tubing spaced 7/8", with line connected as near to their inner ends as practicable. Reflectors are of same material.

Transmission lines and stubs should be kept as symmetrically placed with respect to the antenna as possible. For mechanical reasons it may be desirable to give the 52" ladder line a slight twist at point "X" to permit easier connection to the stub. The 146 mc termination values are suitable over entire band. There will be little increase in SWR with QSY. Grounding may be desirable where lightning is a problem.

---This series will continue in the next issue and give antenna designs as well as the drawings referred to in the text.

A SIDEBAND TRANSMITTING CONVERTER FOR TWO

by Jim Geddes, K7ZIR*

The superiority of sideband for distance work on phone is clearly established. Weak A.M. signals whose presence may be detected only with a BFO are often partially readable on sideband. For a given amount of power on 2 meters, sideband is far superior for DX. This transmitting converter was built to utilize any of a number of commercial low-frequency sideband rigs to convert the signal to 144 MHz. Almost any input frequency can be used except around 28 MHz where there are harmonic problems. The design given was used with 14 and 50 MHz inputs with excellent results. Checks for spurious responses showed them to be very low within 10 MHz. of the signal frequency. The input power required is 100 mw. The output from the converter (CW) was measured with different tubes and ran from 5 to 8 watts. This is sufficient for local work. The power is adequate to drive a p.p. 4X250 final to maximum legal output power.

This converter differs from most others you may have seen in the magazines in that it uses a very low sideband input power level. There are two reasons for this. One is that with mixing at higher power levels you have to use a cavity filter on the output to keep down spurious responses. This converter has three tuned circuits at 144 MHz. so an output filter is not necessary. You can run it right to the antenna. The other reason is that all-transistor sideband generators can be made inexpensively which have adequate power to drive this converter. So if you're only interested in VHF you don't have to put out a lot of money for a low-frequency sideband rig.

Except for possible mistakes in the diagram you should have little if any trouble making this converter operate properly. I suggest you follow the layout exactly, since 5 units have been built and all worked. I made 3 of them and 2 other hams each made one. They used one of my units as a sample.

The make of the feedthru bypasses is not known. You can use button micas. As long as it is designed for feedthru it probably is not critical. Shielded base sockets should be used whether you use shields or not (I didn't).

The 6AN8 operates as an oscillator at 43.333 for a 14 MHz. input and L_1 is tuned to that frequency. L_2 in the pentode section triples, the 6AK5 goes straight through at 130 MHz. The 12AT7 balanced mixer is driven at 130 MHz by the 6AK5 and at 14 by the sideband exciter through L_4, resonant at 14 MHz. Note that the coil table on the diagram gives data for both 14 and 50 MHz. input. The output of the 12AT7 is at 144. The 6360 amplifies as a linear at 144. To tune the last two stages you must feed in c.w. power at 130 and 14 MHz. The divider in the 144 MHz input cuts down the 1 watt drive power to a proper level for the 12AT7. For less than 1 watt drive, eliminate the divider.

There are two ways of getting proper sideband excitation power to the converter. Fig. 1 shows the driver and output stage of a typical sideband rig, such as the SB110, SB401, Drake T4X, etc. You break the excitation to the final with a switch placed inside the unit in a position that minimizes any change in the r.f. wiring. Run a shaft to the switch. Don't try to mount it on the front or rear panel. Also put a capacitive divider in the same area. Run small coax from the junction of the divider to a coax fitting on the back of the exciter or transceiver. With the switch in the "straight through" position, re-tune the coil in the plate of the driver for normal operation of the low-freq. sideband exciter. Then with the sideband converter or a dummy load connect to the co-ax, tune the capacitive divider for maximum output power. Indirectly you are resonating the plate tank of the driver by making the capacitive divider load substitute for the normal final tube load.

For those of you who don't want to go inside the sideband exciter you can use a Heathkit Cantenna or other non-inductive load for the sideband exciter and put a resistive voltage (or power) divider in parallel with it (Fig. 2). You should probably run the sideband exciter at its designed power output. That's why you need the high-wattage dummy load.

The templates shown following should work out well with the exception of the holes for the crystal socket which will vary with different makes. End of text.

* 5955 S.W. 179th, Beaverton, Oregon 97005

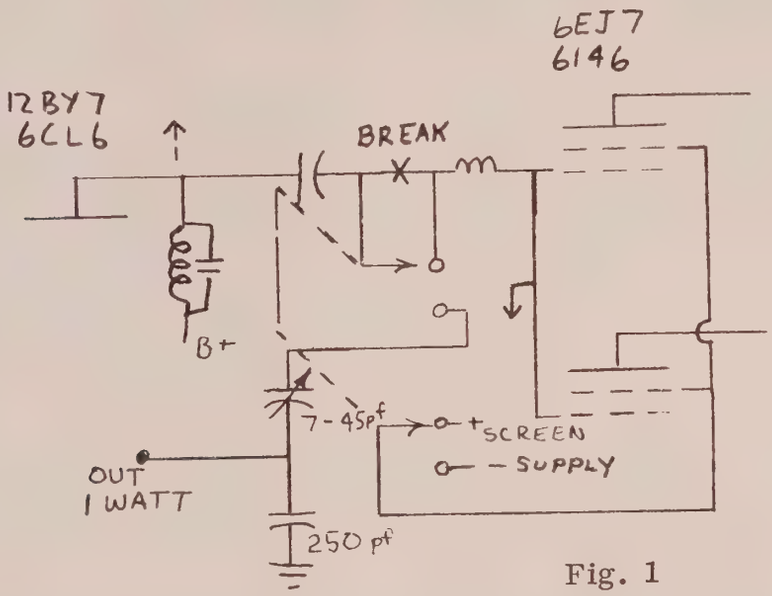


Fig. 1

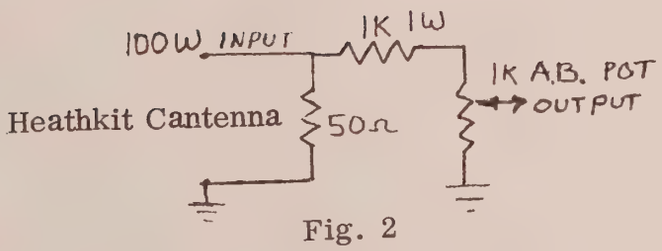


Fig. 2

STATEMENT OF OWNERSHIP

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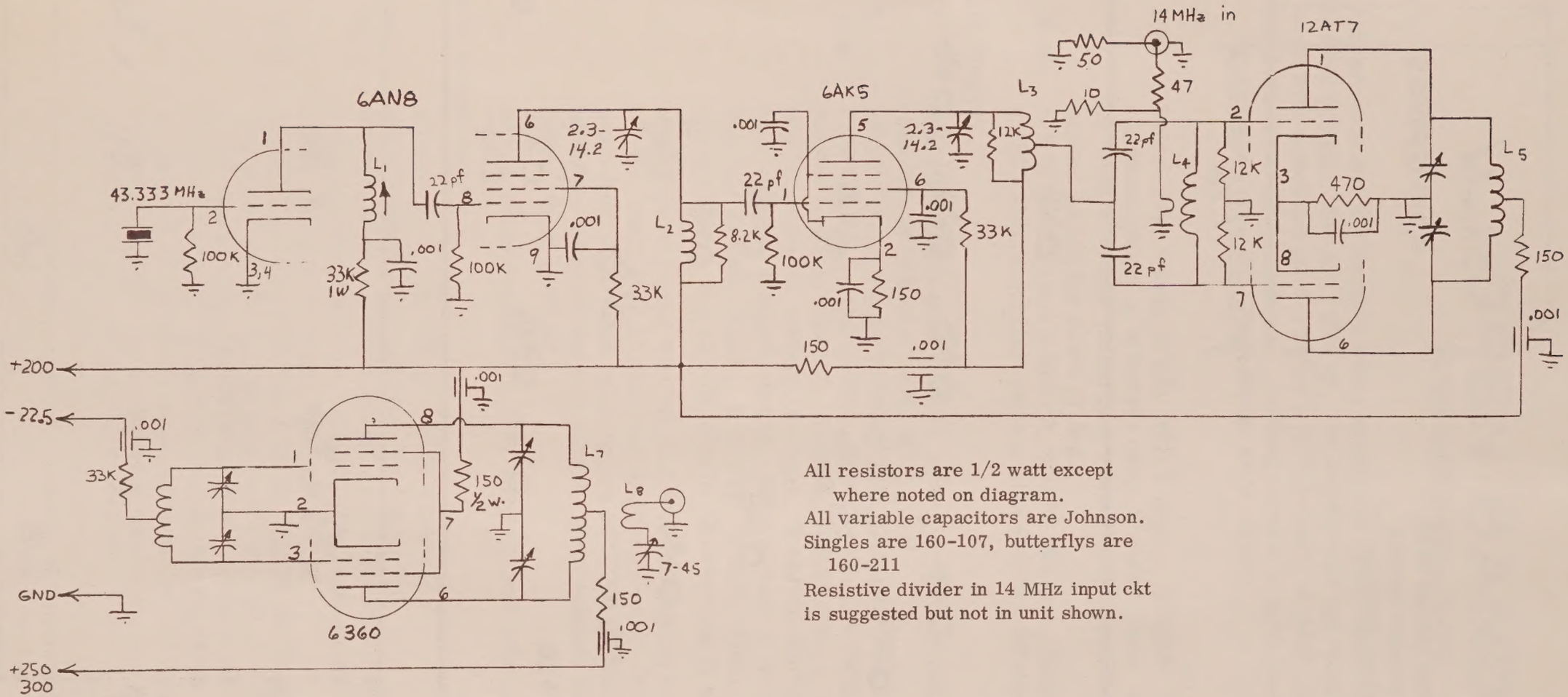
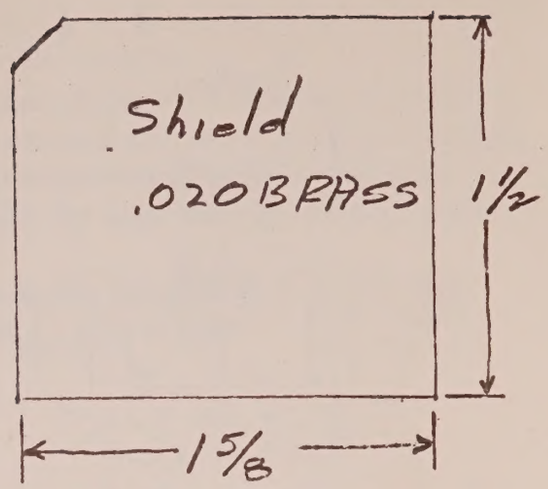
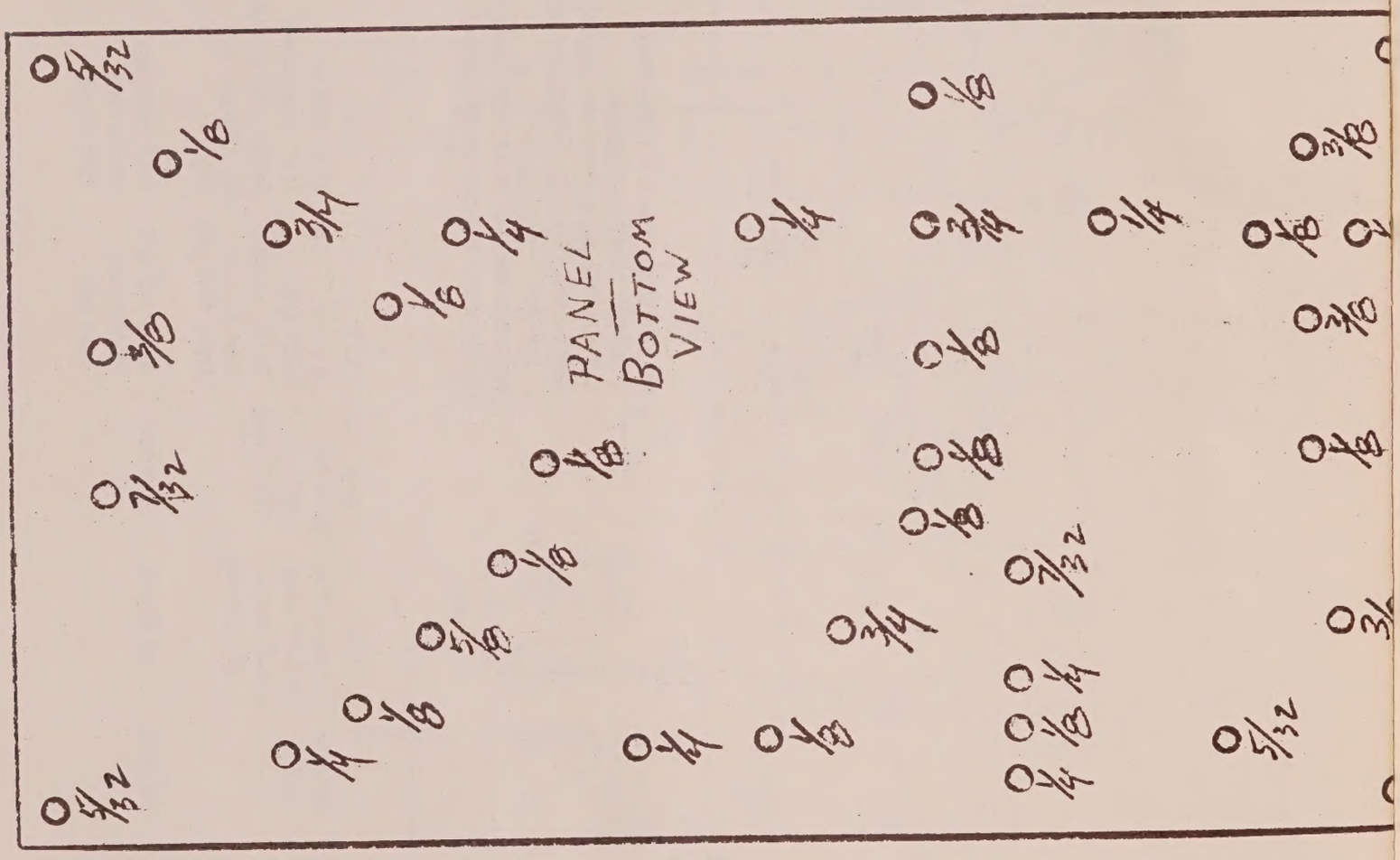


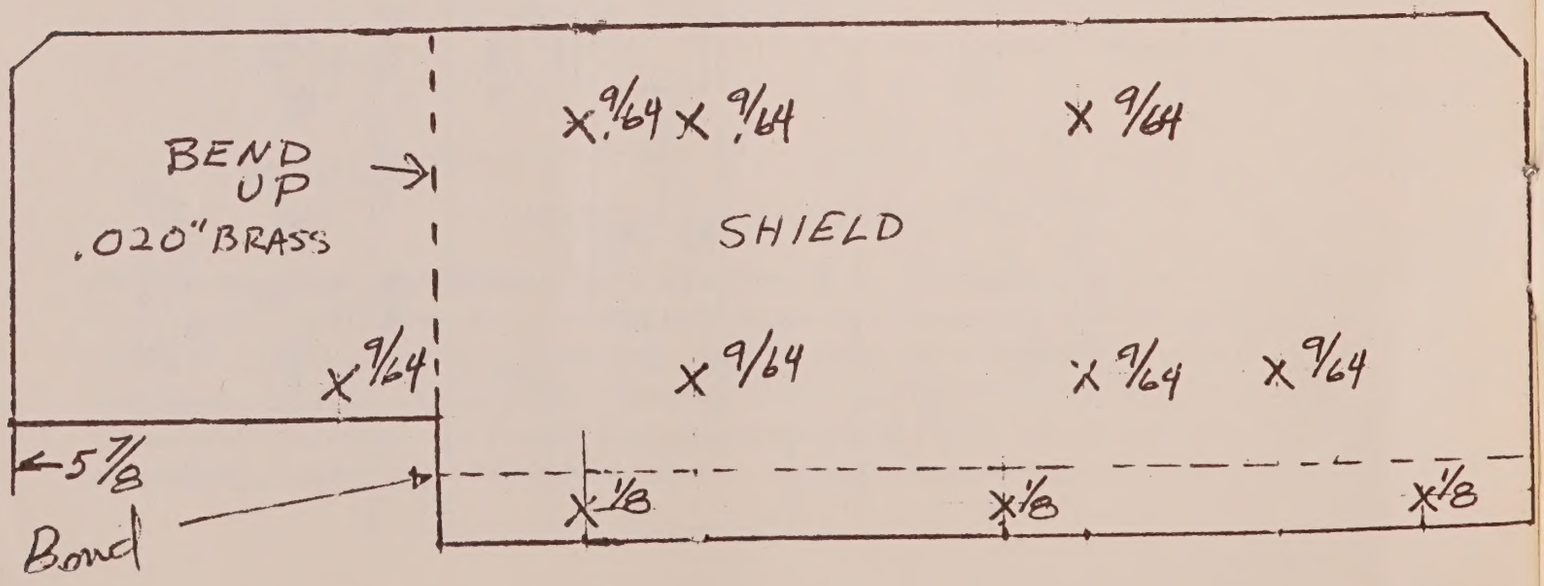
All resistors are 1/2 watt except where noted on diagram.
All variable capacitors are Johnson.
Singles are 160-107, butterflys are 160-211
Resistive divider in 14 MHz input ckt is suggested but not in unit shown.

	L-1	L-2	L-3	L-4	L-5	L-6
50 MHz input	12 turns #24 on 1/4" slug tuned form. .79 microhy	5 t # 18 3/8" i.d. 7/16" long	5 t #18 3/8" i.d. 7/16 " long Tap 1 1/4 t from cold end	12 t. #24 on 1/4" slug tuned form. .79 micro hy., 18 pf. 1 t. link.	7 t. #18, 5/16 " i.d., 1/2" long center tapped	5 t #18, 1/4" i.d. 7/16" l. ctr. tapped
14 MHz	as above	3 turns	4 t., tap 3/4 turn from cold end.	5-10 microhy Cambridge Thermionic	L-7 & L-8 for both 14 & 50 input--6 t #18, 3/8" i.d. with 3/16" space at center for link. Link is 2 t #18, 3/8" i.d.	

Plastic case is Harry Davies #240, available thru mail-order houses and some distributors carrying the Waldom line.







OPEN BANDS

by Marilyn Wiseman, K8ALO

With summer past and fall weather here, activity is light. This seems to be the pattern for this time of year. But don't give up. No matter what the season, someone is bound to come up with something good. There's still a chance of good openings - meteor showers, temperature inversion etc. Looking forward to your report. See you next issue. My address , Box 103, Petersburg, Ohio 44454.

50 MHz

Aug. 1-30 K7ICW (Nev.) wrkd K7ZIR, W7FP (Ore.), W5SFW, WA5RRL (Tex.). 8 stations (Wash.), WA7FPO (Ariz.), plus 8 Calif. stations. hrd WA5RYX (N. Mex.), K7SLC (Utah) plus 3 stations in (Mont.). Al says all types of scatter during the month of Aug.

Sept. 21-23 K7ICW (Nev.) wrkd WA7FTP, W7FIM (Wash.), K6IBY (Calif.). hrd K7ZIR, K7UZQ (Ore.), K7EBW (Ariz.), plus 4 Calif. stations.

144 MHz TROPO

July 7 WØLCN (Minn.) wrkd W5WAX state #14, W5HFV (Okla.), W7UMC/5 (Ark.), state #15, W5ML (La.) state #16.

July 31 WØLCN (Minn.) wrkd WØEKZ (Kan.) state #17, K4IQL/5 (Okla.).

Sept. 9-10 WØNXF (Neb.) wrkd KØGJX, KØFKJ (S.D.), KØMQS (Ia.), WØEKZ, WØSPF (Kans.), WØLZO, WØEMS, WØIAY (Neb.), W5ORH, W5UGO (Okla.), W9JGQ, W9GAO, K9ZGT, WA9LIV, WA9JYR, W9VIT, W9AAG, W9UUN, W9YYF (Ill.), W8DDO, W8IBB, K8LZF (Mich.), WA9JFM (Wisc.), W8WEN, W8FEH, K8DEO, W8SDJ, WA8TYF, WA8BCA(Ohio), K4EJQ (Tenn.), W3OMY (Pa.), and K5WXZ (Tex.). Bob worked 12 states.

Sept. 12 K2HLA (N. Y.) wrkd W4VHH (S.C.) 75OMI signals were 579, 599. Also hrd K4YYJ, W4NUS (N.C.) but they were very weak. W5GVE/4 hrd K2HLA via tropo from 0600 - 0611 cdst calling FP8CA. Bill says Dick's signals were 589 to the noise during this period. Path between Cutchogue N.Y. and Dothan about 1,000 mi.

Sept. 13 K4EJQ (Tenn.) wrkd (S.D.) for state #32 and Minn., state #33.

144 MHz Meteor Scatter

Aug. 11 K7ICW (Nev.) hrd WØLCN (Minn.) 1385 mi.

Aug. 12 WØLCN (Minn.) wrkd K4QIF (Va.) State #18.

Aug. 13 WØLCN (Minn.) wrkd WA2FGK (N.J.) state #19. Sked with W4CKB (Fla.) was a complete shut-out. K7ICW (Nev.) hrd entire QSO between WA5MFZ (N.M.) and K6JYO (Calif.) 515 mi.

Sept. 7-14 K2HLA, W2AZL, W2UTH, W1AZK, W1JSM and K1ABR all ran M/S skeds with FP8CA on St. Pierre Island off the coast of Newfoundland, about 1,000 miles northeast of New York City. FP8CA, operated by K2OJD, WB2FXB. No QSO's were established by any of the stations participating, but for the first time some signals were heard by both ends. Pings and short bursts were heard every morning of the sked period. One eve W2AZL copied a full 2 min burst. K2OJD has been operating 2 meters from St. Pierre quite a few years now and until they tried meteor scatter, he never heard any signals from the U.S. mainland. They're hoping to try this again next Sept. (Thanks to K2HLA for this info.).

144 MHz AURORA

Sept. 20 K2DNR (N.Y.) wrkd W8NUB, K8DGO (Ohio), VE1AFB (Nova Scotia), K4YYJ (N.C.) state #19 hrd W9QXP (Wis.), WA9EMB, W8BLL and many other short distance stations. Sam tried 220 MHz during the aurora, but heard nothing.

432 MHz

Aug. 1 K7ICW (Nev.) wrkd K6HHA (Calif.) 185 mi..
Aug. 6 - 20 K7ICW (Nev.) hrd W6DQJ (Calif.) 225 mi..
Aug. 27 K7ICW (Nev.) wrkd W6DQJ (Calif.) 225 mi..
Sept. 13 K4EJQ (Tenn.) wrkd Va. state #3, Ind. state #4, Mich. state #5, Ill. state #6. Hrd N.Y., Pa. and was hrd in Iowa. Bunky was using approx. 7 watts at the antenna. Much radar DX hrd during the opening.

SKEDS WANTED

WØLCN C.J. Robinson 5036 17th Ave. South Minneapolis Minn. 55417 wants 144 mhz meteor scatter and Tropo. Skeds. Needs most everything in the east. Prefers skeds before 0100 and after 0600 local time and not both the same nights. Equip. pair of 4 x 150-A's, K.W. ant 10 over 10 65'. Conv. H.B. Nuv. C.W. or S.S.B.

K4EJQ J.G. Bunky Botts Route 2 Box 72 Bristol Tenn. 37620. Interested in 432 mhz Skeds with Ohio, Ky., Pa., W.Va., and S.C. Equip. Rig 50 watt (output 30 watts) Rcvr. HQ150 - H.B. Trans CCC Ant 20 ele J-slot ant is 3,000 ft. on Mt. Top. Also open for 144 mhz Sked and can work 144 and 432 mhz at the same time - should anyone want a crossband Sked.

K2HLA Dick Wilborg RFD #1 Cutchogue Long Island N.Y. 11935 wants 144 mhz M/S Skeds with N.D., Kans., and northeast Texas. Will also accept other requests. M/S freq. 144.038 mhz. Rig 500 w into 32 ele colinear 70' fed with 7/8 alumafoam coax. Rcvr 417A con into SX 101A.

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6506 FIFTH STREET
RIO LINDA, CALIF. 95673

Return Requested